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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/842,955
Filing Date: April 25, 2001
Appellant(s): KOSHIBA ET AL.

Carlton H. Hoel
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed March 6, 2006 appealing from the Office action mailed October 5, 2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,990,962	Ueno et al	11-1999
6,037,986	Zhang et al	3-2000

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ueno et al, US 5,990,962 in view of Zhang et al, 6,037,986.

Re claim 1, Ueno et al discloses a method of preprocessing for motion-compensated video encoding (fig.1 and/or 2) comprising:

(a) providing a frame in a video sequence for motion-compensated encoding ("INPUT");

(b) for a pixel in said frame, comparing a difference between (i) the value of said pixel and (ii) the predicted value of said pixel from motion compensation prediction of said frame to a first level *(col.7, lines 13-17, Note: in Ueno, the motion compensation prediction error is the difference between a pixel value of the input video frame and a pixel value of the motion compensated predicted picture)*;

(c) when said comparing of step (b) indicates said difference is greater than said first level, apply lowpass filtering to said pixel *(col. 6, lines 22-25, col. 7, lines 17-20, Note: in Ueno, the comparison to a predetermined threshold value inherently determines whether motion compensation prediction error is greater than said threshold prior to lowpass filtering)*;

and (d) repeating steps (b)-(c) for other pixels of said frame *(fig. 1 and/or 2, Note: in Ueno, preprocessing 11 is inherently an iterative process)*; (e) motion-compensated encoding of said frame after said filtering (12).

In Ueno et al, motion compensation and lowpass filtering decision are carried out at the block level, and not at the pixel level as required in steps b-d as claimed.

However, Zhang et al teaches that lowpass filtering decision at the preprocessor may be done at "per-pixel" level so that the filtered image preserves edges and contours in the original image while also removing many undesirable high frequency components. *(See figs. 2-3: 23, col. 3, line 6-10, "Summary of the Invention", col. 6, line 25 to col. 7, line 62, col. 12, line 11-21).*

Therefore, taking the combined teaching of Ueno et al and Zhang et al as a whole, it would have been obvious and advantageous to modify motion compensation and lowpass filtering decision in Ueno et al to perform at "per-pixel" level as taught in Zhang et al for the benefit of obtaining a filtered image that preserves edges and contours in the original image while also removing many undesirable high frequency components.

Re claim 2, the method of claim 1, wherein: (a) said filtering of step (c) of claim 1 is filtering is both spatial in said frame and temporal over other frames of said video sequence *(See Ueno et al, fig. 1:14, col. 6, lines 4-25, Note: in Ueno, the filter 14 acts to filter spatially the input image signal, and temporally, the motion compensated predicted signal. Zhang et al also teaches filtering in both spatial and temporal domain, see "Summary of the Invention").*

(10) Response to Argument

Appellant asserts that Ueno filters the entire block. In contrast, claim 1 requires comparison at each pixel because only some pixels in a block may be filtered. The

statement is correct. The examiner acknowledges this in the grounds of rejection (see paragraph 9 above), which states "[I]n Ueno et al, motion compensation and lowpass filtering decision are carried out at the block level, and **not** at the pixel level as required in steps b-d as claimed[.]" To solve the deficiency, Zhang et al (a secondary reference) was relied upon to obviated filtering at a pixel level.

Appellant asserts that Zhang's preprocessing is not based on motion compensation. Appellant further asserts that in Zhang, there are no motion vectors and no motion compensation; instead just motion and edge detection. Appellant concludes that Zhang can be performed independently of that of Ueno, and the combination does not suggest the claims. Although appellant's arguments are understood, the examiner respectfully disagrees.

First, claim 1 calls for "preprocessing **for** motion-compensated video encoding". Likewise, Zhang teaches preprocessing (fig. 3: 42) **for** motion-compensated video encoding (fig. 3: 24, Note: MPEG-2 compression is a motion-compensated video encoding standard). Claim 1 does not explicitly recite motion vectors as asserted, although it is well known in the art that motion vectors would have been implied in motion-compensated video encoding. In Zhang, MPEG-2 compression (fig. 3: 24) would have necessitated motion vectors for motion compensation.

Second, the preprocessing of claim 1 requires evaluating a pixel difference for each pixel in a frame (i.e., current frame), and then deciding whether to filter said each pixel based on the difference value. Likewise, Zhang teaches this aspect as stated in

the grounds of rejection *(See figs. 2-3: 23, col. 3, line 6-10, "Summary of the Invention", col. 6, line 25 to col. 7, line 62, col. 12, line 11-21).*

Third, claim 1 requires motion-compensated encoding of the current frame after all pixels in the frame have been pre-processed (i.e. filtered). Likewise, Zhang teaches this aspect (fig. 3: 24, col. 6, line 9-15).

Finally, claim 2 requires spatial filtering in the current frame and temporal filtering over multiple frames. Likewise, Zhang teaches this aspect (*See "Summary of the Invention", Note: Ueno also teaches spatial and temporal filtering as stated in the grounds of rejection).*

In conclusion, as stated in the grounds of rejection, the preprocessing in Zhang would have been advantageous in Ueno because the "per-pixel" level filtering provides the benefit of obtaining a filtered image that preserves edges and contours in the original image while also removing many undesirable high frequency components.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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